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Online Case Based Self-Study Modules as an Adjunct Learning Tool in Otorhinolaryngology: A Pilot Study

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Abstract

Background/Need for innovation: Undergraduate students in Otolaryngology are on the lookout for easy modes of learning which can help them understand concepts better as well as score more in examinations. A need was hence felt to introduce a new learning resource to supplement traditional teaching-learning methods. Methods: Digital, case based self–study modules were prepared using all open source technology and validated by experts in the specialty. The modules were uploaded on a website specifically created for the purpose. They were pilot tested on twenty consenting third year undergraduate (MBBS) students using a crossover design. Post test comprising of multiple choice questions was administered to the students after a period of two weeks. Feedback was obtained from faculty and students. Results: Test scores were found to be significantly higher amongst students who used the learning modules as a supplement to regular bedside teaching ($p < 0.001$; Wilcoxon signed rank test). Majority of students agreed that the modules helped them gain confidence during internal assessment examinations and would help revision. Conclusions: Online, case based, self-study modules helped students to perform better when used as a supplement to traditional teaching methods. Students agreed that it enabled easy understanding of subject and helped them gain confidence.

Keywords

Self-Study Modules, Teaching-Learning Methods, Web-Based Instruction, Online Learning

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1. Introduction

The undergraduate student is overburdened with information and is on the lookout for easier modes of learning for concept enhancement and better performance in examinations. Information Technology based (IT) applications have permeated through almost every field and medical education is no exception. Undergraduate training in Otolaryngology (ORL) is mainly imparted through traditional classroom based teaching, bedside clinics and operating room teaching. The combination of a web based forum with traditional methods would provide for a blended learning environment. While, bed side clinics continue to be the best setting in which the skills of history taking, physical examination, clinical reasoning, decision making, empathy and professionalism can be taught as a whole to medical students, online learning when combined with traditional methods is easily repeatable and can thus increase the effectiveness of teaching. As a facilitator in ORL, the first author felt the need to introduce a new learning resource to revive student interest in the subject of ORL and to promote active self-directed learning. This project was undertaken to develop case oriented self-study modules in ORL, evaluate the impact of these modules on student learning as well as assess student and faculty feedback on these online self learning modules.

2. Methodology

This study was done in a private medical college affiliated to a Deemed University in South India. Approval was obtained for the project from the University ethics committee. Discussions were initiated with IT experts in the university. Department faculty was apprised of the proposed project. Specific learning objectives for four "**MUST KNOW**" cases (Deviated Nasal septum, Antrochoanal polyp, Ethmoidal polyposis and Chronic Tonsillitis) were written. Digital self learning modules comprising interlinked history, clinical examination, investigations, diagnosis and patient management were developed. Videos and images were used. Flash player was used as a container for all videos. Hot Potatoes™ Version 6 (Free software for creating interactive multiple-choice, short-answer, jumbled-sentence, crossword, matching/ordering and gap-fill exercises for the World Wide Web; http://hotpot.uvic.ca/) was used for creating the quizzes, crosswords, matching and gap fill exercises (**Figure 1**). Feedback questionnaire for was designed using SurveyMonkey® (Online questionnaire and survey software; http://www.surveymonkey.com/). The modules were validated by experts in the specialty and uploaded on a dedicated website created for the purpose. The learning modules were pilot tested on 20 third year undergraduate (MBBS) students who gave consent to participate in the study. A cross over design was adopted and the students were randomly divided into two groups of 10 each. Access to two modules was secured to each group respectively. Both the groups were taught all the 4 cases during the bed side clinics as well.

After a period of two weeks, a post test comprising 40 multiple choice questions (10 questions pertaining to each module) was administered to both the groups. Student feedback on the modules was obtained using a 5-point Likert Scale questionnaire (5 = Very strongly agree 4 = Strongly agree 3 = Agree 2 = Strongly disagree 1 = Very strongly disagree). Faculty perceptions were assessed using a questionnaire. Post test scores obtained were statistically analyzed using Wilcoxon signed rank test. Internal consistency of the student feedback questionnaire was estimated by Cronbach alpha calculated using MS-Excel calculator. Likert scale responses were interpreted using Consensus measure [1].

3. Results

The Cronbach alpha of the student feedback questionnaire was 0.92. Mean rating for items analyzed in the student feedback ranged between 1.6 - 3.4 (1-strong agreement and 5-strong disagreement). The student feedback responses represented as Consensus measure are depicted in **Figure 2**. Majority (85%) of students agreed that the modules helped them gain confidence during internal assessment examinations and would help revision. They also felt that the quality of the modules with respect to audiovisual material was good but further improvements could be made with respect to resolution. Most students (95%; n = 19) also said that such modules should be prepared for all other topics in the subject and also the same should be replicated in other subjects as well. They also found the quizzes and crosswords embedded in each module to be interesting and agreed that such self study modules increased their understanding of the subject matter and its clinical application. Most of the students mentioned that the website was slow and videos took very long to load. This was also noted by the faculty. The strengths and weaknesses as described by the students and faculty in their feedback responses are

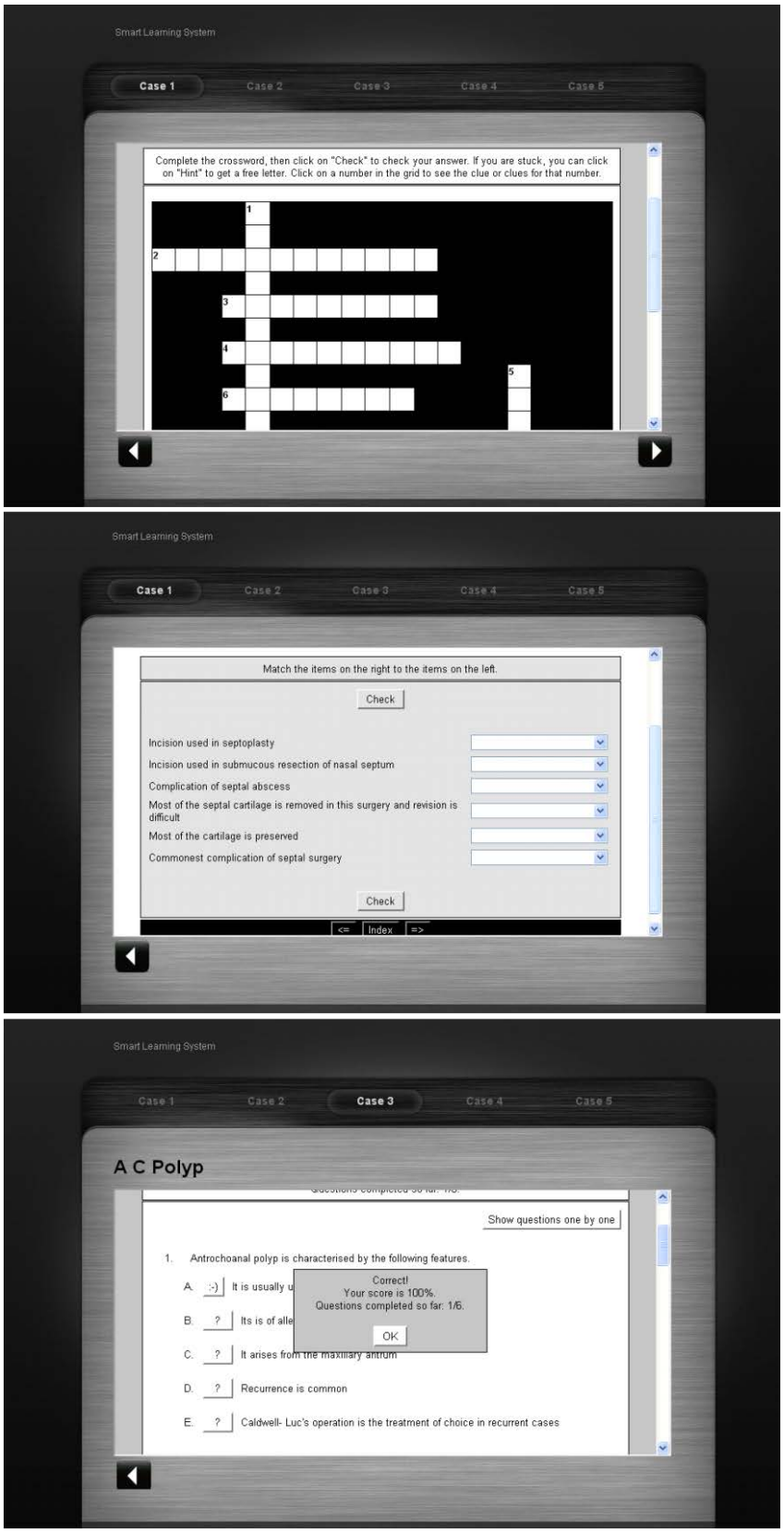

Figure 1. Screen shot of the crosswords, matching and gap fill exercises.

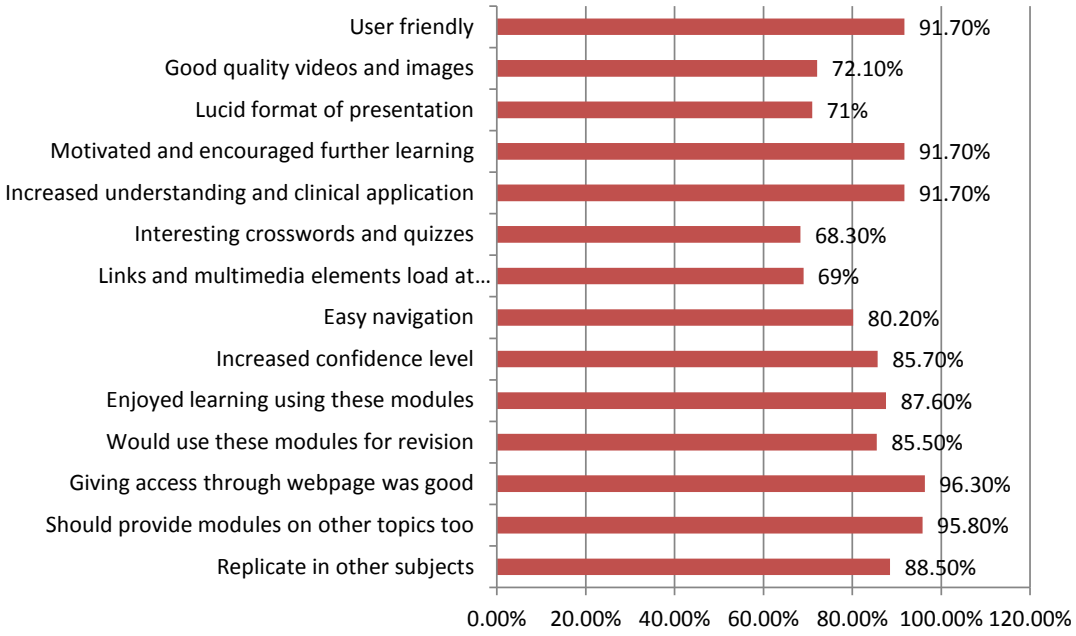

Figure 2. Students feedback-consensus measure (Values closer to 100 indicate greater agreement and values greater indicate greater disagreement).

summarised in **Table 1**. Post test scores were found to be significantly higher amongst students who used the learning modules as a supplement to traditional teaching ($p < 0.001$ as calculated by Wilcoxon signed rank test).

4. Discussion

Web based instruction has been gaining popularity in medical education in recent years. The combination of online instruction with traditional teaching methods has been observed to enhance learning outcomes [2]-[5]. Otorhinolaryngology (ORL) is one of the subjects taught to medical students during the third year medical undergraduate (MBBS) course in India. Teaching is accomplished through lectures, seminars and patient demonstrations. The internet offers an enriching platform and permits students to learn at their own pace. Online self study modules are an effective and inexpensive tool that could be used to enhance learning. They are easily repeatable and promote self-directed learning.

Online learning modules have been introduced in specialties such as emergency medicine, and pediatric and adolescent gynecology and increase in knowledge as well as test scores has been demonstrated [4] [5]. A pilot study done in the field of dermatology suggested that interactive IT based self learning modules could be combined effectively with a “play area concept”. Although these did not improve student performance in their written examinations, the authors have opined that these modules would promote self-directed learning among students and thus enhance the quality of teaching and learning in dermatology [6]. Similarly, in a study where free online otolaryngology educational modules were provided to residents, quantifiable improvement in examination scores was not noted. However, it was recommended as an inexpensive way to enhance learning opportunities. The ease of access alone without the need to carry a textbook or journal made these modules a valuable learning resource [2].

The results of this study showed improved student performance when these modules were used as a supplement to traditional teaching methods as evidenced by better post test scores. Since the modules were case based, students opined that they were practical and increased their understanding of the subject. They also agreed strongly that they would use these modules to revise for exams. They found some of the crosswords tough for which they are being given more practice time. Both students and faculty remarked that the website was slow and videos took long to load. This aspect is being looked into by the IT experts. This was a pilot study and hence had the limitations of being tried on a small sample of students. The number of topics covered was also limited. However, the results are encouraging and gave us confidence that such modules could be prepared using open source technology even in resource limited settings like ours.

Table 1. Summary of strengths and weaknesses of learning modules as described by students and faculty.

STUDENTS		FACULTY	
Strengths	Weaknesses	Strengths	Weaknesses
Simple and clear explanation, easy to revise	Slow website—some videos don't load, no home/back button	Practical oriented, systematic approach to case	Slow website—videos don't load
Good videos, each module has small videos of short duration	Information overload	Fun filled interactive quizzes and crosswords	Doesn't cover entire course content, more modules need to be developed
The quizzes and crosswords were fun	Some crosswords were very tough to crack	Good audiovisuals, short videos, can be watched multiple times and hence improved retention	Few unclear images
Practical oriented	Resolution should be bigger	Clarity of presentation, caters to slow learners	Repetition is needed for difficult information

Future Plans

We plan to improve the existing modules based on the feedback received from students and make them more interactive. We also plan to develop more modules to cover the entire otolaryngology curriculum in future.

5. Conclusion

Online case based self learning modules increased students performance when used as an adjunct to traditional teaching methods for undergraduate teaching in ORL. They enabled easy understanding of subject among students and fostered confidence in them. These would help in revision for examinations. They serve as an efficient means of enhancing self-directed learning. It is therefore suggested that a virtual repository of case oriented self learning modules is created and used for training and assessment of students.

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Conflicting Interest

Nil.

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References

[1] Tastle, W.J., Russell, J. and Wierman, M.J. (2008) A New Measure to Analyze Student Performance Using the Likert Scale. *Information Systems Education Journal*, **6**. http://isedj.org/6/35/

[2] Cabrera-Muffly, C., Bryson, P.C., Sykes, K.J. and Shnayder, Y. (2015) Free Online Otolaryngology Educational Modules: A Pilot Study. *JAMA Otolaryngology—Head & Neck Surgery*, **141**, 324-328. http://dx.doi.org/10.1001/jamaoto.2015.41

[3] Kandasamy, T. and Fung, K. (2009) Interactive Internet-Based Cases for Undergraduate Otolaryngology Education. *Otolaryngology—Head and Neck Surgery*, **140**, 398-402. http://dx.doi.org/10.1016/j.otohns.2008.11.033

[4] Burnette, K., Ramundo, M., Stevenson, M. and Beeson, M.S. (2009) Evaluation of a Web-Based Asynchronous Pediatric Emergency Medicine Learning Tool for Residents and Medical Students. *Academic Emergency Medicine*, **16**, S46-S50. http://dx.doi.org/10.1111/j.1553-2712.2009.00598.x

[5] De Silva, N.K., Dietrich, J.E. and Young, A.E. (2010) Pediatric and Adolescent Gynecology Learned via a Web-Based Computerized Case Series. *Journal of Pediatric and Adolescent Gynecology*, **23**, 111-115. http://dx.doi.org/10.1016/j.jpag.2009.09.008

[6] Kaliyadan, F., Manoj, J., Dharmaratnam, A.D. and Sreekanth, G. (2010) Self-Learning Digital Modules in Dermatology: A Pilot Study. *Journal of the European Academy of Dermatology and Venereology*, **24**, 655-660. http://dx.doi.org/10.1111/j.1468-3083.2009.03478.x